

AMENDMENTS TO THE CLAIMS

1. – 8. (Canceled)

9. (Previously presented) An image encoding method comprising:
generating a transformation coefficient for each block by transforming an image from a spatial domain into a frequency domain for each block, characterized by comprising the step of quantizing the plurality of transformation coefficients for each block upon setting the same quantization width in the plurality of blocks, wherein the step of quantizing comprises the steps of analyzing visual sensitivities of the plurality of blocks, determining the quantization width in accordance with a block exhibiting high visual sensitivity, setting a dead zone width larger than a dead zone width of the block exhibiting high visual sensitivity to a block with lower visual sensitivity, and quantizing the transformation coefficient; and
calculating the dead zone width from at least one of a prediction mode of the image, a direction of intra frame prediction of the image, motion of the image, a direction of inter frame prediction of the image, an average absolute error of the image, a variance of the image, an image range of the image, an average absolute error of a prediction error signal of the image, and a variance of a prediction error signal of the image.

10. (Previously presented) An image encoding method comprising:
generating a transformation coefficient for each block by transforming an image from a spatial domain into a frequency domain for each block, characterized by comprising the step of quantizing the plurality of transformation coefficients for each block upon setting the same quantization width in the plurality of blocks, wherein the step of quantizing comprises the steps of analyzing visual sensitivities of the plurality of blocks, determining the quantization width in accordance with a block exhibiting high visual sensitivity, setting a dead zone width larger than a dead zone width of the block exhibiting high visual sensitivity to a block with lower visual sensitivity, and quantizing the transformation coefficient; and
calculating the dead zone width from one of a minimum value of an average absolute error of each of a target block and a neighboring block, a minimum value of a variance of the image

of each of the target block and the neighboring block, and a minimum value of an image range of the image of each of the target block and the neighboring block.

11. (Currently amended) An image encoding method which comprises the step of generating a transformation coefficient for each block by transforming an image from a spatial domain into a frequency domain for each block, characterized by comprising the steps of calculating an ideal quantization parameter for encoding an input moving image with preferable image quality, generating a dead zone scale based on a ratio of a quantization step size of evaluating a relationship between a quantization width corresponding to the ideal quantization parameter to a quantization step size of, and a quantization width corresponding to a quantization parameter used for encoding output, and quantizing the transformation coefficient upon setting [[the]] a dead zone width in correspondence with the evaluated relationship correspondingly with the dead zone scale to quantize a quantization coefficient.

12. – 19. (Canceled)

20. (Previously presented) An image encoding apparatus which comprises transformation means for generating a transformation coefficient for each block by transforming an image from a spatial domain into a frequency domain for each block, characterized by comprising quantization means for quantizing the plurality of transformation coefficients for each block upon setting the same quantization width in the plurality of blocks, wherein said quantization means comprises dead zone generating means for analyzing visual sensitivities of the plurality of blocks, determining the quantization width in accordance with a block exhibiting high visual sensitivity, setting a dead zone width larger than a dead zone width of the block exhibiting high visual sensitivity to a block with lower visual sensitivity, and quantizing the transformation coefficient,

characterized in that said dead zone generating means further comprises dead zone scale generating means for calculating the dead zone width from at least one of a prediction mode of the image, a direction of intra frame prediction of the image, motion of the image, a direction of inter frame prediction of the image, an average absolute error of the image, a variance of the image, an

image range of the image, an average absolute error of a prediction error signal of the image, and a variance of a prediction error signal of the image.

21. (Previously presented) An image encoding apparatus which comprises transformation means for generating a transformation coefficient for each block by transforming an image from a spatial domain into a frequency domain for each block, characterized by comprising quantization means for quantizing the plurality of transformation coefficients for each block upon setting the same quantization width in the plurality of blocks, wherein said quantization means comprises dead zone generating means for analyzing visual sensitivities of the plurality of blocks, determining the quantization width in accordance with a block exhibiting high visual sensitivity, setting a dead zone width larger than a dead zone width of the block exhibiting high visual sensitivity to a block with lower visual sensitivity, and quantizing the transformation coefficient,

characterized in that said dead zone generating means further comprises dead zone scale generating means for calculating the dead zone width from one of a minimum value of an average absolute error of each of a target block and a neighboring block, a minimum value of a variance of the image of each of the target block and the neighboring block, and a minimum value of an image range of the image of each of the target block and the neighboring block.

22. (Currently amended) An image encoding apparatus which comprises transformation means for generating a transformation coefficient for each block by transforming an image from a spatial domain into a frequency domain for each block, characterized by comprising quantization control means for calculating an ideal quantization parameter for encoding an input moving image with preferable image quality, dead zone scale generating means for generating a dead zone scale based on a ratio of a quantization step size of evaluating a relationship between a quantization width corresponding to the ideal quantization parameter to a quantization step size of, and a quantization width corresponding to a quantization parameter used for encoding output, and quantization means for quantizing the transformation coefficient upon setting [[the]] a dead zone width in correspondence with the evaluated relationship correspondingly with the dead zone scale to quantize a quantization coefficient.

23. – 30. (Canceled)

31. (Previously presented) A non-transitory computer-readable medium that causes a computer to function as transformation means for generating a transformation coefficient for each block by transforming an image from a spatial domain into a frequency domain for each block, quantization means for setting a dead zone, and quantizing the plurality of transformation coefficients for each block by using the same quantization width, and dead zone generating means for analyzing visual sensitivities of the plurality of blocks, determining the quantization width in accordance with a block exhibiting high visual sensitivity, and setting a dead zone width larger than a dead zone width of the block exhibiting high visual sensitivity to a block with lower visual sensitivity,

characterized in that the dead zone generating means further comprises dead zone scale generating means for calculating the dead zone width from at least one of a prediction mode of the image, a direction of intra frame prediction of the image, motion of the image, a direction of inter frame prediction of the image, an average absolute error of the image, a variance of the image, an image range of the image, an average absolute error of a prediction error signal of the image, and a variance of a prediction error signal of the image.

32. (Previously presented) A non-transitory computer-readable medium that causes a computer to function as transformation means for generating a transformation coefficient for each block by transforming an image from a spatial domain into a frequency domain for each block, quantization means for setting a dead zone, and quantizing the plurality of transformation coefficients for each block by using the same quantization width, and dead zone generating means for analyzing visual sensitivities of the plurality of blocks, determining the quantization width in accordance with a block exhibiting high visual sensitivity, and setting a dead zone width larger than a dead zone width of the block exhibiting high visual sensitivity to a block with lower visual sensitivity,

characterized in that the dead zone generating means further comprises dead zone scale generating means for calculating the dead zone width from one of a minimum value of an average absolute error of each of a target block and a neighboring block, a minimum value of a variance of

the image of each of the target block and the neighboring block, and a minimum value of an image range of the image of each of the target block and the neighboring block.

33. (Currently amended) A non-transitory computer-readable medium that causes a computer to function as transformation means for generating a transformation coefficient for each block by transforming an input moving image from a spatial domain into a frequency domain for each block, quantization control means for calculating an ideal quantization parameter for encoding the input moving image with preferable image quality, dead zone scale generating means for generating a dead zone scale based on a ratio of a quantization step size of evaluating a relationship between a quantization width corresponding to the ideal quantization parameter to a quantization step size of, and a quantization width corresponding to a quantization parameter used for encoding output, and quantization means for quantizing the transformation coefficient upon setting [[the]] a dead zone width in correspondence with the evaluated relationship correspondingly with the dead zone scale to quantize a quantization coefficient.